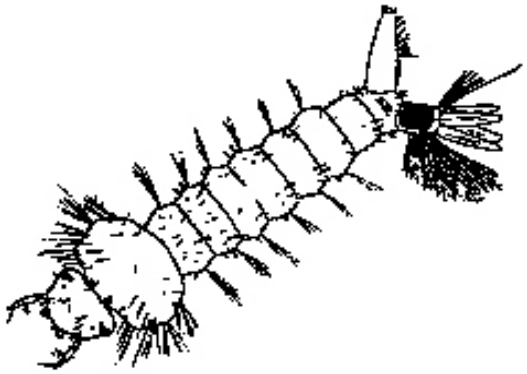
Permit Applicant Guide for Private Property: Controlling Mosquito Larvae for Prevention and/or Control of West Nile Virus



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Ontario Ministry of the Environment

Ontario

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1.0 Introduction

This permit applicant guide outlines the requirements for requesting a permit to purchase and use a pesticide (i.e., larvicide to control mosquito larvae) for the prevention or control of West Nile Virus (WNV) on private property when supported by the local Medical Officer of Health (MOH). Private property includes but is not limited to:

- shopping centres
- schools and school boards
- apartment complexes, condominiums, townhouse complexes
- residential, farm, commercial and industrial properties
- recreational lands (e.g., conservation authorities, zoos, amusement parks etc.);
- Crown Land and associated properties
- utility company right of ways, rail lines or road ways
- other private land that is not included in a municipal or Health Unit WNV program.

Public notification requirements for WNV larvicide programs are included in this guide (see **Appendix 2**).

NOTE: This guide does not include mosquito larvicide programs intended for nuisance control.

Regulation 914 under the *Pesticides Act* requires:

- a person to obtain a permit approved by the Director under the Act, authorizing that person to apply a pesticide to a water body to control a pest (referred to as a water extermination).

- a licensed exterminator holding a Mosquito/Biting Flies or Aerial licence to obtain a permit approved by the Director under the Act, authorizing that exterminator to apply a pesticide to a water body.

- a person who owns a property intended for treatment, or a full-time employee of the property owner, to obtain a permit approved by the Director under the Act, authorizing that person to purchase a pesticide. (**Note the following**: a permit is not required if the water body which the person intends to treat is wholly located within the boundaries of his or her property and has no direct or indirect outflow, other than by percolation, beyond his or her property boundary - this would not include catch basins since they drain off of the property or are located on easements).

Completed permit application forms and support documentation must be submitted to the Regional Pesticides Specialist **(See Table 1 for office locations)** responsible for the county in which the pesticide application will take place.

2.0 Mosquitoes as Vectors of West Nile Virus (WNV)

The risk assessment made to determine whether WNV may or will impact people is based on numerous factors. The identification of mosquito larvae and adults species present and their numbers is a part of this risk assessment and will determine the location and timing of larvicide applications, in order to disrupt the transmission cycle of WNV.

Culex pipiens and *Cx. restuans* are two mosquito species that feed predominately on birds but will occasionally bite humans and other mammals. *Culex* mosquitoes overwinter as adult females and possibly overwinter infected with WNV. It is also possible that migratory birds also return to Ontario infected with the virus. In early spring, the pre-mated *Culex* females that have survived the winter disperse from overwintering sites in sewers, outbuildings, subterranean enclosures and basements to feed on the blood of birds (especially nestlings). *Culex* mosquitoes feed mainly after sunset and before dawn.

In Ontario, *Culex pipiens* and *Cx. restuans* are thought to be the species of importance in maintaining and amplifying WNV in the bird population. After feeding on the blood of birds, female *Culex* lay their eggs in containers, catch basins, grassy roadside ditches, tire ruts, rain barrels, swimming pool covers, stored boats or other containers that hold stagnant water. A favourable breeding site in early spring for *Culex* mosquitoes is inside cups, pop tins, plastic bottles, plastic bags, abandoned tires and other litter. *Culex restuans* females emerge earlier than *C. pipiens* and the discarded containers that hold snow melt waters and spring rains provide an attractive incubated breeding site. Discarded litter should be collected and properly disposed of in early spring to reduce the number of potential breeding sites.

Several overlapping generations of *Cx. pipiens* or Cx. *restuans* may be present from April to August depending on temperature and breeding site abundance. The majority of adult *Culex* females that develop in mid to late August do not blood feed before mating and seeking overwintering sites (winter diapause). *Culex* females that develop from mid-summer broods may take numerous blood meals from WNV infected birds and when biting mammals infect the mammals with the virus.

WNV appears to be lethal to many birds in the family Corvidae (e.g., American crows, ravens and jays) and the presence of WNV-positive dead birds is the often the first sign that WNV is present and spreading through the local bird population (this is known as epizootic amplification). It is likely that *Cx. restuans* is the key species involved in the early season amplification of WNV in the bird population (it is possible that urban sparrow and starling populations may have a role as reservoirs for WNV). The virus eventually spills over into the human population later in the season when *Cx. pipiens* is predominate and is breeding in catch basins. *Cx. pipiens* is thought to be the main “bridge vector” since it predominately bites birds but will also bite mammals. Other

mosquito species such as *Aedes vexans*, *Culex salinarious* and certain *Ochlerotatus* species may also have a role as bridge vectors. Controlling *Culex* mosquitoes in the early spring in surface waters to reduce the amplification of WNV in the bird/mosquito cycle and throughout the summer in catch basins to prevent the spill over of WNV to human populations should be considered as part of an integrated mosquito control program.

The use of larvicides should be considered as part of an integrated mosquito management program that includes:

- **public education and awareness campaigns that promote personal protection**
- **mosquito breeding site reduction on private and public property**
- **removal and proper disposal of discarded tires and other containers that hold stagnant water, and**
- **monitoring and surveillance programs**

Larviciding programs, based upon monitoring larvae presence, should be considered through early spring to mid summer in stagnant surface water bodies such as ditches and in mid to late summer in catch basins to greatly reduce mosquito larvae development.

Larviciding should be targeted to those catch basins that have high organic content due to a close proximity of trees or lawns which may contribute leaves and grass clippings. In general, catch basins located along major roadways and in parking lots do not have high organic content and therefore mosquito larvae are unlikely to be in low numbers.

Other species of mosquitoes that are predominant in summer months, such as *Aedes vexans*, *Coquillettidia pertubans* and other species that are less common such as *Culex salinarius, Ochlerotatus trivittatus, Och. triseriatus, Och. stimulans, Anopholes punctipennis* and *An. walkeri* may act as “bridge vectors” transmitting WNV from infected birds to humans. *Aedes vexans* breeds predominately in temporary pools created by rainfall (e.g., roadside ditches, flooded pastures). Adult mosquitoes are present from May to first hard frost. *C. pertubans* has one generation per year and breeds in cattail marshes.

If adult mosquito trap surveillance indicates that bridge vectors other than *Cx. pipiens* or *restuans* have a high rate of virus infection then it may be necessary to initiate larviciding programs to target these specific species. Larviciding through late spring to early fall of temporary pools created by rainfall will control *Aedes vexans* larvae from developing into adult mosquitoes. This should reduce the number of adult mosquitoes and lower the risk of humans developing WNV from summer biting mosquitoes. The control of *C. pertubans* in cattail marshes is very difficult. The larvae do not surface feed but attach to hollow cattails to breathe and filter feed below the surface therefore the larvicide often does not contact the larvae.

3.0 Pesticide Regulations

The management of pesticides is a joint responsibility of the federal and provincial governments. Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for assessing pesticides to determine if they are acceptable in terms of safety, merit and value. Pesticides approved by PMRA are granted registration which allows them to be sold and used in Canada.

The Ministry of the Environment (MOE) regulates the sale, use, transportation, storage and disposal of federally registered pesticides in Ontario under the *Pesticides Act* and Regulation 914. Pest control products are classified into one of six classes or "schedules". The schedule determines who can sell or use the pesticide product and what restrictions (e.g., requires a licence and/or permit) are placed on its use. For current information on classified products, consult the Ontario Pesticides Advisory Committee web site and link to the PEPSIS data base at www.opac.gov.on.ca. **Appendix 3** provides a list of currently classified larvicides for use under permit for WNV.

4.0 Private Property WNV Prevention and/or Control Programs

Owners of private property (e.g., shopping centres, school boards, apartment complexes, residential, farm, commercial and industrial properties, utility company right of ways, rail lines etc.) or managers of recreational lands (e.g., conservation authorities, zoos, amusement parks etc.) or administrators of Crown Land (e.g., Management Board Secretariat, Ministry of Natural Resources, Ministry of Transportation, Ontario Realty Corporation, federal agencies etc.) may conduct a larviciding program in water bodies located on property they own or manage supported by the local MOH.

A mosquito control program would likely be initiated to support and compliment a municipal or Health Unit program that is sanctioned by a local MOH or is ordered under Section 13 of the *Health Protection and Promotion Act (HPPA)* in an urban area. A permit application that is supported by a health hazard order, issued by the local MOH, will be considered as a very high priority by MOE.

NOTE: Catch basins located on private property normally drain into a public storm drain system and therefore permission must be obtained from the proper jurisdiction in order to use a larvicide in a catch basin. Written permission to apply a larvicide into such a catch basin must accompany a permit application. Ditches along side public roads also are the property of municipalities and written permission to apply a larvicide into these surface water bodies must accompany a permit application form.

A permit application form may be submitted by:

- a licensed exterminator contracted by a private property owner
- a private property owner who holds an appropriate exterminator's licence
- a full-time employee, who holds an appropriate exterminator's licence, of a private

property owner.

The written support or an *HPPA* health hazard order from the local MOH must accompany the permit application form. Please note that this support may have the following conditions:

- Application of larvicide to water bodies on private land can occur only if the water body cannot be drained or modified.
- The licensed exterminator must provide in writing a copy of all permits. The information submitted must identify clearly the addresses of the private properties and the type of water bodies intended to be treated with a mosquito larvicide before the larviciding program begins.
- Copies of the year end reports (summary reports) submitted to the MOE, when completed, for all permits issued must be also submitted to the Health department.

MOE encourages early submission (e.g., early April) of <u>completed</u> permit application forms and supporting documentation. Submissions will be reviewed and considered for approval subject to site-specific terms and conditions appended to the permit.

Applicants may "combine" treatment sites under a single permit. For example, if a licensed exterminator has contracted a school board within a Health Unit to apply larvicide to catch basins on 23 school properties and larvicide to 5 ponds located at 5 schools then <u>two</u> permit applications must be submitted - Form 7A for all catch basins on the school board property and Form 7B to include the 5 ponds. For condominium complexes, several properties may be bundled under 1 permit application providing they are all located within the same Health Unit.

4.1 Surveillance

Dead bird surveillance, adult mosquito trapping, larvae surveys and mapping are very important for determining the need for larviciding programs. Private property owners are encouraged to conduct surveillance and monitoring programs through a licensed exterminator and to coordinate their programs with the local municipality and/or Health Unit, who conduct dead bird, mosquito and human surveillance, to determine if a larviciding program is warranted.

4.2 Licensing Requirements and Technicians

A pest management company requires an Operator's licence in order to run a business that uses pesticides to control pests. A pest management company that provides a service to control mosquito larvae is conducting a water extermination. This requires at least $1 million in third-party liability insurance and other insurance requirements

prescribed in Regulation 914. In addition, the company must ensure that its insurance policy allows for the use of pesticides in water (i.e., the policy has no exclusion for water exterminations). An Operator must hire appropriately licenced exterminators to carry out the larviciding program.

Private property owners that intend to use a larvicide in a water body located on their property are not required to obtain an Operator's licence if their full-time employees are appropriately licensed and apply the larvicide.

A WNV larviciding program must be conducted by an appropriately licensed exterminator holding one of the following valid licences:

- Mosquito/Biting Flies for ground equipment application of a larvicide
- Aerial for aircraft application of a larvicide

An appropriately licensed exterminator may indirectly supervise (i.e., visit the extermination site at least once per week) up to 7 technicians. See Section 20.1, 20.2 and 20.3 of Regulation 914 under the *Pesticides Act* (on line versions are available at www.e-laws.gov.on.ca) regarding the use of pesticides by unlicensed assistants.

4.3 Permit Application Submission

Private property owners may decide to submit a permit application in order to conduct larviciding programs based upon scientific/health related data such as real time dead bird and mosquito surveillance activities or past years surveillance data.

MOE will only consider the use of larvicides containing methoprene or *Bacillus thuringiensis* var. *israelensis* under permit use for the control of WNv.

Permit application forms and support documents for larviciding should be submitted separately for any of the following four types of larviciding programs:

A. Catch basins/storm drains:

- Methoprene products will be considered for application to catch basins/storm drains since these are high in organic content and suspended silt and it is unlikely that non-target aquatic organisms will be present (Note: *Bti* has limited efficacy in water bodies with high organic and silt content).
- Label rate for methoprene pellets is 0.7 g per catch basin (equivalent to a broadcast application rate of 11.2 kg/ha in water with a high organic matter content) based on an average surface water area of 0.6 m^2. Catch basins with an average surface water area greater than 0.6 m^2 would receive proportionately more of the methoprene pellets.
- A greater amount of methoprene pellets per catch basin is consistent with

label directions if drainage from the catch basin is impeded and the water in the catch basin is backed up, above the level of the outlet pipe, allowing standing water in the storm sewer drain. This would be determined by a pre-treatment inspection (see **Appendix 7)**. A review of best practices indicates that an amount of up to 3.5 g of methoprene pellets may be applied in such situations and is consistent with label directions.

- See **Appendix 7** for detailed information on determining application rates.

B. Ditches and Temporary Pools or Permanent Pools including storm water management ponds

- *Bacillus thuringiensis* var. *israelensis* (*Bti*) products will be considered for application in ditches and temporary pools or permanent pools including storm water management ponds since these water bodies may support non-target aquatic organisms (methoprene may have an impact on these organisms whereas *Bti* is very specific to mosquito larvae and only has a minimal impact on other aquatic fly larvae).
- The rate of application will be determined by the larval instar stage, target species etc. as indicated on product labels.

C. Sewage and sludge storage lagoons

- Methoprene products will be considered for application in sewage and sludge lagoons since these water bodies are high in organic content and it is unlikely that non-target aquatic organisms will be present (Note: *Bti* has limited efficacy in water bodies with high organic content).
- A label rate for methoprene products of 11.2 kg/ha for broadcast application of pellets and 22.4 kg/ha of granules is in accordance with label directions for water with a high organic content (see **Appendices 4 and 5** for determining organic content of water bodies).

D. Wetlands: Permit applications will be reviewed according to the Wetlands Protocol developed in cooperation with the Ministry of Natural Resources and the appropriate environmental agencies (see **Appendix 9).**

- *Bacillus thuringiensis* var. *israelensis* (*Bti*) products will be considered for use in wetlands since these water bodies support non-target aquatic organisms (methoprene may have an impact on these organisms whereas *Bti* is very specific to mosquito larvae and only has a minimal impact on other aquatic dipterans).
- The rate of application will be determined by the larval instar stage, target species, etc., as indicated on *Bti* product labels.

4.4 Permit Submission Checklist

Previous Applicants:
Applicants who:

- obtained an approved permit in 2003 for a mosquito larvae control program for WNv and provided MOE with hard copy maps/electronic maps and/or digital mapping coordinates; and
- are applying for a permit to conduct a 2004 mosquito control program for WNv without changes to the proposed treatment area information

must provide items 1, 2, 3, 4, 5, 7 and 8 below. You are not required to resubmit maps (item 6 below) with your permit application submission, however, maps will be required with your summary report.

New Applicants:
A new application for a permit to use a larvicide for the control of mosquito larvae as a preventative or control action against WNV **must** include the following information as support documentation:

1. ☐ A completed permit application form (see **Appendix 1**). Use permit application Form 7A when applying for approval to use a larvicide in catch basins and Form 7B when applying for approval to use a larvicide in surface water bodies. If it is not possible to provide the name, licence number and business information (including the name and Operator's licence number if applicable) of the licensed exterminator responsible for carrying out the larviciding program (i.e., water extermination) at the time of applying for the permit, then this information may be submitted immediately prior to the initiation of larviciding.

2. ☐ Proof of insurance coverage indicating that your policy allows for a water extermination.

3. ☐ A written statement from an official representative of a town, city municipality, etc., within of the jurisdiction of the private property authorizing the use of a larvicide into catch basins, storm drains or ditches located on the private property that are owned by the town, city, municipality etc. **NOTE:** This written statement is not required if an order is issued under the *Health Protection and Promotion Act*.

4. ☐ A written statement from the property owner/manager authorizing the use of a larvicide.

5. ☐ A copy of an order under the *Health Protection and Promotion Act* **or** a letter of support from the local MOH indicating:
   - ❍ A mosquito larviciding program is considered necessary or appropriate to reduce *Culex restuans* or *Cx. pipiens* larvae and prevent the epizootic amplification of WNV, based upon current data or data obtained from the

previous year's WNV-positive dead bird and/or mosquito surveillance programs in that jurisdiction or a neighbouring jurisdiction **and/or**

❍ A mosquito larviciding program is considered necessary to reduce *Cx. pipiens, Aedes vexans* or other mosquito species that may act as a bridge vector species for WNV from birds to humans based on data obtained from the current year's WNV-positive dead bird/animal/human and/or mosquito surveillance programs.

NOTE: A copy of a HPPA order or support letter from the MOH may be already on file with the MOE. Contact the Pesticide Specialist to determine if this is the case (see **Table 1**).

6. ☐ Map(s) of the treatment site. Submission of electronic maps and/or digital mapping data are strongly encouraged. If available, please provide digital mapping data to the Regional Pesticides Specialist who will use your electronic information to generate maps for MOE purposes (depending on location within Ontario). Digital mapping coordinates and street addresses should be submitted as detailed in **Appendix 8.**

The minimum requirements for map elements for any type of larvicide program are as follows:

- map scale 1:25,000
- identification of all Sensitive areas (see **Appendix 6** for detailed definitions) including;
  - critical fish habitat – feeding, migration, nursery and spawning areas
  - wetlands - marshes, bogs, fens and swamps
  - headwater areas – the area starting at the lake highest up in the watershed
  - fish sanctuary – area where fishing for all species is prohibited
  - fish hatchery – designated area of fish rearing
  - endangered species habitat – as designated in Regulations under the *Endangered Species Act*
  - irrigation water sources – water drawn for the irrigation of crops/turf
  - potable and livestock water supplies – water used for human and animal consumption
  - areas where human recreational water activities may occur – examples: swimming, wading etc.

Mapping information for catch basins must include

- the approximate boundaries of the treatment area(s) / storm sewer shed
- the approximate number and approximate area of catch basins proposed for the treatment area / storm sewer shed (for schools, condominiums and other small private land sites exact locations must be provided)
- the location of all discharge points/outflows if catch basins are located at or near a Sensitive area

- the name of the immediate receiving water (e.g., Lake Ontario, Humber River) if catch basins are not located at or near a Sensitive area (**Please indicate catch basins which drain into a municipal sewer system**).

Mapping information for ditches, temporary and permanent pools, storm water retention ponds and wetlands* must include:

- the approximate boundaries of the treatment area(s)
- the location of all discharge points/outflows if the surface water treated is located at or near a Sensitive area
- the name of the immediate receiving water (e.g., Lake Ontario, Humber River) if the surface water treated is not located at or near a Sensitive area
- the estimated total area (in hectares) proposed for treatment

* Permit Applications for wetland areas must follow the protocol for a Wetlands permit (See **Appendix 9**)

For private property programs a second map detailing the site must be submitted with the permit application that includes the location of the property in relation to major intersections. This map may be a site blue print or drawing but must contain orientation (N, S, E, W), all buildings, parking areas and sensitive areas including:

- any creeks, streams, rivers, lakes that run through or border the property as well as any storm sewer out flows into these areas
- designation of bordering properties e.g. industrial factory, ravine, commercial business etc.

If digital mapping coordinates are submitted rather than maps, a statement regarding discharge and/or outflow must accompany the permit application Form 7A and/or 7B.

7. ☐ A description of measures that will be used to protect Sensitive areas from potential impact due to possible movement of the larvicide from the target area.

8. ☐ Monitoring data is required for some types of larviciding programs. See Section **5.0** below for **<u>required</u>** pre and post larviciding monitoring data and Section **6.0** for **<u>recommended</u>** monitoring procedures.

4.5 Summary Report Requirements

MOE approved permit conditions will require that a summary report be submitted by December 1st identifying the location(s) where larviciding treatments occurred. The MOE strongly encourages that all information submitted on the actual locations and/or areas of larvicide use be submitted in electronic format including digital mapping

coordinates (see **Appendix 8**). The summary report must include the following information.

- a map indicating the dates, locations and total number of applications of a larvicide to catch basins, ditches and temporary or permanent pools including storm water management ponds or wetlands and the name of the immediate receiving waters (e.g., Humber River, Cranberry Marsh) or if they discharge into a municipal storm system.
- the name of the pesticide used, Pest Control Products Act number, rate of application and quantities of product used in **each** water body.
- the public notification option used (provide copies of the actual newspaper notice(s) (including the date of publication and newspaper name) or written notice(s) (including the method of distribution such as bulletin board, door to door etc.).
- reference to any incidents involving the handling or use of the larvicide that was reported to the District MOE office or SAC.
- Completed pre and post larviciding efficacy monitoring forms (see **Appendices 4** and **5**) for each water body if required (see section **5.0** above for MOE requirements).

5.0 MOE Permit Requirements for Monitoring

A textual description of the methods that will be used to comply with the MOE requirements listed below **must be included** with the permit application support documentation.

A. Catch basins/storm drains using methoprene:

- No monitoring requirements - See section **6.0** below for monitoring recommendations.

B. Ditches and Temporary or Permanent pools (including storm water management ponds) using Bti**:**

- MOE **requires** that pre-larviciding monitoring be conducted to determine organic matter content (e.g., presence of algae on water surface indicates high organic content and requires a higher label rate) and larval instar stage (e.g., lower label rate for 1st and 2nd instars; higher label rate for 3rd and 4th instars) in order to select the proper application rate of Bti (see **Appendix 4**). **Note:** larvae must be present in order to apply Bti.

C. Sewage or Sludge lagoons using methoprene:

- No efficacy monitoring requirements (see section **6.0** below for efficacy monitoring recommendations).

D. Wetlands using Bti**:**

- MOE **requires** that pre-larviciding monitoring be conducted to determine degree of organic material content and larval instar stage in order to select the proper application label rate of Bti.
- MOE **requires** that post-larviciding monitoring of 10 typical sites (minimum) be conducted to sample for the number of larvae present within 24 - 48 hours after treatment of Bti to determine efficacy (see **Appendix 4**).

6.0 MOE Recommendations for Monitoring

MOE recommendations listed below are at the discretion of the permit holder.

A. Catch basins/storm drains using methoprene:

- MOE **recommends** the pre-larviciding monitoring of catch basins to determine larvae counts and evaluate a need to apply methoprene.
- MOE **recommends** the post-larviciding monitoring of catch basins to determine pupal development to adult (refer to the methoprene product guide literature or the guidance for methoprene efficacy monitoring provided in **Appendix 5**).

MOE suggests that a minimum of 30 catch basins proposed for larvicide treatment with a larvicide be randomly selected and monitored for methoprene efficacy.

B. Ditches and Temporary or Permanent pools (including storm water management ponds) using Bti**:**

- MOE **recommends** that post-larviciding monitoring of ditches and temporary or permanent pool to sample for the number of larvae present within 24 - 48 hours after treatment of Bti to determine efficacy

MOE suggests that post-larviciding monitoring should include as a minimum, several ditches, temporary pools and permanent pools and sampling around the margins at several points of these water bodies.

C. Sewage or Sludge lagoons using methoprene:

- MOE **recommends** that pre-larviciding monitoring at 10 points around the perimeter of sewage or sludge lagoons to determine larva counts and evaluate a need to apply methoprene.
- MOE **recommends** post-larviciding monitoring at 10 points around the perimeter of sewage or sludge lagoons to determine pupal development to adult (refer to the methoprene product guide literature or the guidance for methoprene efficacy monitoring provided in **Appendix 5**).

D. Wetlands using Bti**:**

See requirements in section **5.0** above.

7.0 Permit Conditions

Permit applications will be reviewed by the Regional Pesticide Specialists. A permit application that is complete and includes all of the required support documentation will be processed within five business days of receipt.

A licensed exterminator who is granted an approved permit to apply a larvicide must comply with the requirements of Regulation 914 under the Pesticides Act**. In addition, the approved permit may have the following conditions:**

- Larvicide use is limited to a licenced exterminator (Mosquito/Biting Flies for ground-based application or Aerial for aircraft application), or a trained Technician under the supervision of a Mosquito/Biting Flies licence holder (in accordance with Sections 20.1 and 20.2 of Regulation 914 under the Pesticides Act) or a licensed exterminator who is considered a Technician in accordance with Section 20.1 (1.1) of Regulation 914 under the Pesticides Act.

- This permit and conditions of use are approved for 2004 only.

- A copy of the permit must be provided to each larviciding crew at an extermination site.

- Larvicide must be applied according to label directions.

- Larvicide must be placed into catch basins through the grate and must not be applied to catch basins if there is sufficient water flow, such as during heavy rainfall, that does not allow for the proper settling of the larvicide at the bottom of each catch basin sump.

- Public notification must be provided as set out in the document “Public Notification of a Water Extermination for the Control of Immature Stages of Mosquitoes (Larviciding Programs for WNv)” (see **Appendix 2**).

- The licensed exterminator responsible for the use of the larvicide must immediately report any situations involving health or environmental effects or damage to property resulting from the application of the larvicide to the local MOE District Office (telephone number will be provided on the approved permit), or if a pesticide spill occurs, to the Spills Action Centre at **1-800-268-6060**.

- A summary report must be provided by December 1st of the year to the Regional Pesticides Specialist.

- Additional conditions determined on a case by case basis.

Table 1
Ontario Ministry of Environment - Regional Pesticide Specialists

REGION County/Township	PESTICIDE SPECIALIST(S) Mailing Address	Telephone/Toll Free/Fax
Central Region Toronto, Halton, Peel York and Durham	**Cathy Wright** (cathy.wright@ene.gov.on.ca) **Tom Cowan** (tom.cowan@ene.gov.on.ca) 5775 Yonge St, 8th Floor Toronto, Ontario M2M 4J1	(416) 326-3477 (416) 326-3671 Toll Free 1-800-810-8048 Fax (416) 325-6347
West-Central Region Haldimand, Norfolk, Niagara, Hamilton-Wentworth, Dufferin, Wellington, Waterloo, Brant	**Suzanne Howe** (suzanne.howe@ene.gov.on.ca) Rob Leriche (rob.leriche@ene.gov.on.ca) 119 King St. West, 12th Floor Hamilton, Ontario L8P 4Y7	(905) 521-7551 (905) 521-7658 Toll Free 1-800-668-4557 Fax (905) 521-7820
Eastern Region Frontenac, Hastings, Lennox & Addington, Prince Edward, Leeds & Grenville, Prescott & Russell, Stormont/Dundas & Glengarry Peterborough, Victoria, Northumberland, Renfrew, Ottawa-Carleton, Lanark, District of Nipissing (Twsps. of Airy, Murchison, Dickens, Lyell and Sabine), Haliburton	**Roberto Sacilotto** (roberto.sacilotto@ene.gov.on.ca) 133 Dalton Avenue Kingston, Ontario K7L 4X6	(613) 549-4000 ex 2684 Toll Free 1-800-267-0974 (In Eastern Region only) Fax (613)548-6908
Southwestern Region Elgin, Middlesex, Oxford, Essex, Kent, Lambton, Bruce, Grey, Huron, Perth, Muskoka, Simcoe	**Terri Cordeiro** (terri.cordeiro@ene.gov.on.ca) 733 Exeter Rd., London, Ontario N6E 1L3	(519) 873-5047 Toll Free 1-800-265-7672 Fax (519) 873-5020
Northern Region (east) Manitoulin, Nipissing, Parry Sound, Sudbury, Algoma (East), Timiskaming, Sault Ste. Marie	**John Negusanti** (john.negusanti@ene.gov.on.ca) 199 Larch Street, Ste 1101 Sudbury, Ontario P3E 5P9	(705) 564-3249 Toll Free 1-800-890-8516 Fax (705) 564-4180
Northern Region (west) Algoma (West), Cochrane, Kenora, Rainy River, Timmins, Thunder Bay	**Don Mitchell** (don.mitchell@ene.gov.on.ca) 435 James St. S., Suite 331 Thunder Bay, Ontario P7E 6S7	(807) 475-1712 Toll Free 1-800-875-7772 Fax (807) 475-1754

OTHER CONTACTS

Environmental Assessment and Approvals Branch • Licensing	2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5 Tel. 416-314-8001 (toll free 1-800-461-6290) Fax 416-314-8452	**Carlos Cascallar (Director)** (416) 314-7425 carlos.cascallar@ene.gov.on.ca **Selina Tse** (416) 314-8079 selina.tse@ene.gov.on.ca
Ridgetown College - University of Guelph • Certification for licensing • Technician Program • Vendor Certification	toll free 1-888-620-9999	
Pesticide Industry Regulatory Council (PIRC) **Pesticide Industry Council (PIC)** • Technician Program	Toll free 1-800-668-7017 Toll free 1-800- 265-5656	
Standards Development Branch • Policy and Notification requirements • Product Information • Adulticiding Information	40 St. Clair Ave W., 7th Floor Toronto ON. M4V 1M2 Tel. 416-327- 5519 Fax: (416) 327-2936	**Lorna Poff (Co-Manager)** (416) 327-4138 Pofflo@ene.gov.on.ca **Geoff Cutten** (416) 327-5174 Cuttenge@ene.gov.on.ca
Environmental Monitoring and Reporting Branch **Environmental Monitoring Studies** • Efficacy Studies • Water Quality Studies	125 Resources Rd Toronto, ON M9P 3V6 Fax: (416) 235-6124	**Al Hayton** (416) 327-7470 al.hayton@ene.gov.on.ca **Stacey Baker** (416) 327-6419 stacey.baker@ene.gov.on.ca
Spills Action Centre	**1-800-268-6060**	

Appendix 1

Permit Application Forms 7A and 7B

MOE requests that the permit application be completed and signed by an appropriately licensed exterminator who is responsible for the larviciding program.

Ministry of the Environment / Ministère de l'Environnement

Ontario

Pesticides Act - Form 7A / *Loi sur les pesticides* - Formulaire n◦ 7A

Application For A Permit To Purchase A Pesticide And/Or Perform A Water Extermination in Catch Basins
Demande d'un permis d'acheter un produit antiparasitaire ou d'effectuer un traitement antiparasitaire dans un puisard, une bouche d'égout ou bassin collecteur

Personal information requested on this form is collected under the authority of the *Pesticides Act*, RSO, 1990, Ontario Regulation 914. It is used to evaluate applications for permits to use restricted pesticides according to the requirements of the Pesticides Act. Questions should be directed to your nearest Ministry of the Environment Regional Office. / Les renseignements personnels demandés dans le présent formulaire sont recueillis en vertu du *Règlement 914 de l'Ontario* pris en application de la *Loi sur les pesticides*, L.R.O. 1990. Ils serviront à traiter les demandes d'un permis d'utiliser des produits antiparasitaires à usage contrôlé, conformément aux prescriptions de la *Loi sur les pesticides*. Veuillez adresser toute question au bureau de la Direction régionale du ministère de l'Environnement.

Applicant Information / Renseignements sur l'auteur de la demande

Legal name of Property owner / Nom légal du propriétaire	Contact name / Nom de la personne ressource	Tel. no. / Téléphone
Mailing address / Adresse postale		
Treatment site address if different than property owner / Adresse de l'endroit où sera effectué le traitement, si cet endroit est différent de l'adresse du propriétaire		

Pesticide and Site Information / Renseignements sur le produit antiparasitaire et l'endroit où sera effectué le traitement

Name of pest / Nom du nuisible

Name of pesticide / Nom du produit antiparasitaire

Pest Control Products Act **No. / N◦ d'enregistrement du produit (le numéro attribué conformément à la** Loi sur les produits antiparasitaires**)**

Active ingredient(s) / Matière(s) active(s)

Area to be treated (attach a map or digital mapping coordinates; see Appendix 8 in applicant guide) / Zone à traiter (annexer une carte ou des coordonnées de cartographie numérique; voir l'annexe 8 de la *Marche à suivre*)

Approximate number of catch basins to be treated / Numbre approximatif de bassins collecteurs à traiter

Average size of catch basins to be treated (m^2)/ Dimensions moyennes des bassins collecteurs à traiter (m^2)

Rate Requested / Dose de traitement demandée

Quantity requested / Quantité demandée

Street boundaries enclosing treatment area / Rues qui bornent la zone à traiter

Township / Canton

District / County / Municipality / District, comté, municipalité

Date range of treatments/ Période du traitement (entre quelle date et quelle date)

Estimated No. of treatments / Nombre approximatif de traitements

Use of surface water receiving catch basin outflow / Utilisation des eaux de surface où se déchargement les eaux du bassin collecteur

- ☐ **Swimming / Baignade**
- ☐ **Fishing / Pêche**
- ☐ **Drinking / Eau potable**
- ☐ **Crop irrigation / Irrigation de cultures**
- ☐ **Livestock watering / Abreuvement d'animaux**
- ☐ **Other (autre) Specify (préciser)** .....
- ☐ **Boating / Navigation de plaisance**

Has a permit been issued previously?/ Un permis a-t-il déjà été délivré?

☐ **Yes / Oui** ☐ **No / Non**

Last permit no. /N° du dernier permis

Letter of support from Medical Officer of Health attached? / Avez-vous annexé une lettre du médecin hygiéniste indiquant qu'il appuie le traitement?

☐ **Yes / Oui** ☐ **No / Non**

Letter of permission from property owner attached? / Avez-vous annexé une lettre du médecin hygiéniste indiquant qu'll appuie le traitement?

☐ **Yes / Oui** ☐ **No / Non**

Has any site information changed since previous permit? / Les renseignements au sujet de l'endroit où aura lieu le traitement ont-ils changé depuis l'obtention du dernier permis?

☐ **Yes / Oui** **No /Non** ☐

Specify / Préciser :

Form of Public Notification / Méthode utilisée pour informer le public

- ☐ **Newspaper / Annonce publiée dans un journal**
- ☐ **Flyer / Feuille distribuée aux portes**
- ☐ **Pesticide use sign / Écriteau**

Name of exterminator / Nom de la personne qui fera le traitement	Address / Adresse	Tel. No. / Téléphone
Licence number / N° de son permis de lutte antiparasitaire	**Operator Name / Nom de l'exploitant de l'entreprise**	**Licence Number / N° de son permis d'exploitant**
Signature of applicant / Signature de la personne qui présente la demande		**Date**

Ontario

Ministry of the Environment | Ministère de l'Environnement

Pesticides Act - Form 7B / *Loi sur les pesticides* - Formulaire n◦ 7B

Application For A Permit To Purchase A Pesticide And/Or Perform A Water Extermination
Demande d'un permis d'acheter un produit antiparasitaire ou d'effectuer un traitement antiparasitaire dans un plan d'eau

Personal information requested on this form is collected under the authority of the Pesticides Act**, RSO, 1990, Ontario Regulation 914. It is used to evaluate applications for permits to use restricted pesticides according to the requirements of the Pesticides Act. Questions should be directed to your nearest Ministry of the Environment Regional Office. / Les renseignements personnels demandés dans le présent formulaire sont recueillis en vertu du** Règlement 914 de l'Ontario **pris en application de la** Loi sur les pesticides**, L.R.O. 1990. Ils serviront à traiter les demandes d'un permis d'utiliser des produits antiparasitaires à usage contrôlé, conformément aux prescriptions de la** Loi sur les pesticides**. Veuillez adresser toute question au bureau de la Direction régionale du ministère de l'Environnement.**

Applicant Information / Renseignements sur l'auteur de la demande

Legal name of Property owner / Nom légal du propriétaire	Contact name / Nom de la personne ressource	Tel. no. / Téléphone

Mailing address / Adresse postale

Treatment site address if different than property owner / Adresse de l'endroit où sera effectué le traitement, si cet endroit est différent de l'adresse du propriétaire

Pesticide and Site Information / Renseignements sur le produit antiparasitaire et l'endroit où sera effectué le traitement

Name of pest / Nom du nuisible

Name of pesticide / Nom du produit antiparasitaire

Pest Control Products Act **No. / N◦ d'enregistrement du produit (le numéro attribué conformément à la** Loi sur les produits antiparasitaires**)**

Active ingredient(s) / Matière(s) active(s)

Rate Requested / Dose de traitement demandée

Quantity requested / Quantité demandée

Date range of treatments/ Période du traitement (entre quelle date et quelle date)

Estimated No. of treatments / Nombre approximatif de traitements

Area to be treated (attach a map or digital mapping coordinates; see Appendix 8 in applicant guide) / Zone à traiter (annexer une carte ou des coordonnées de cartographie numérique; voir l'annexe 8 de la Marche à suivre**)**

Approximate size of treatment area(s) ha / Superficie approximative du plan d'eau ou des plans d'eau à traiter (en hectares)

Estimated number of treatment sites / Nombre approximatif d'endroits à traiter

Street boundaries enclosing treatment area / Rues qui bornent la zone à traiter

Township / Canton	District / County / Municipality / District, comté, municipalité

Use of surface water receiving outflows / Utilisation des eaux de surface réceptrices

- ☐ **Swimming / Baignade**
- ☐ **Drinking / Eau potable**
- ☐ **Crop irrigation / Irrigation de cultures**
- ☐ **Livestock watering / Abreuvement d'animaux**
- ☐ **Boating / Navigation de plaisance**
- ☐ **Fishing / Pêche**
- ☐ **Other (autre) Specify (préciser)** .....

Has a permit been issued previously?/ Un permis a-t-il déjà été délivré?

☐ **Yes / Oui** ☐ **No /Non**

Last permit no. / N° du dernier permis

Letter of support from Medical Officer of Health attached? / Avez-vous annexé une lettre du médecin hygiéniste indiquant qu'il appuie le traitement?

☐ **Yes / Oui** ☐ **No / Non**

Form of Public Notification / Méthode utilisée pour informer le public

- ☐ **Newspaper / Annonce publiée dans un journal**
- ☐ **Flyer / Feuille distribuée aux portes**
- ☐ **Pesticide use sign / Écriteau**

Has any site information changed since previous permit? / Les renseignements au sujet de l'endroit où aura lieu le traitement ont-ils changé depuis l'obtention du dernier permis?

☐ **Yes / Oui** ☐ **No /Non**

Specify / Préciser :

Name of exterminator / Nom de la personne qui fera le traitement	Licence number / N° de son permis de lutte antiparasitaire
Address / Adresse	Tel. No. / Téléphone
Operator Name / Nom de l'exploitant de l'entreprise	Licence Number / N° de son permis d'exploitant

Signature of applicant / Signature de la personne qui présente la demande	Date

Appendix 2

Public Notification of a Water Extermination
for the Control of Immature Stages of Mosquitoes
(Larviciding Programs for West Nile Virus)
Private Land Programs

Public notification Option 1 or 2 or 3 must be used for larvicide applied on private property to:

A. Catch Basins
B. Ditches, temporary or permanent pools including storm water management ponds
C. Sewage or sludge lagoons
D. Wetlands

Option 1

Publication of a notice in a newspaper of general circulation in the vicinity of the proposed water extermination at the beginning of the larviciding program and printed such that it is not less than 10 cm in width or the nearest equivalent in column layout. (For example, a notice would be published in a local newspaper in April indicating that larvicide will be placed in catch basins on the private property every three weeks until September). See sample notice below.

Option 2

Distribution of a written notice at the beginning of the larviciding program to all land owners or persons in charge of land within the application area. In addition, the posting of the notice at all door entrances to public buildings on the private land prior to each larviciding treatment and to remain posted for at least 48 hours. (For example - catch basin larviciding at several schools; a notice would be provided to the superintendent of the school board and to the principal of each school in April. In addition, the notice must be posted before each larviciding treatment and remaining posted for at least 48 hours on all entrance doors to the school where the larvicide is being applied). See sample notice below that can also be modified for surface water larviciding.

The notice in Option 1 and 2 above must include the following:

- **The details of the larviciding program including:**
  - **the pest to be controlled (i.e., mosquito larvae) and purpose for control (i.e., West Nile Virus).**
  - **proposed date(s) the water extermination is to take place.**
  - **the location of the larviciding program (e.g., name of the water body, street boundaries, all catch basins on a specific street, etc.).**
  - **the name of the larvicide and the registration number assigned to the product under the** Pest Control Products Act **(Canada).**
  - **the formulation (e.g., pellet, granular).**
  - **a telephone number (indicating collect calls will be accepted) that provides the public with information regarding the larviciding program and includes updates on the street location and dates of larviciding. A web site may be used in addition to a telephone number.**

Sample Notice for Catch basins:

NOTICE OF PESTICIDE USE

Between April 1 to October 31, 2004 the [name of property] will be conducting a larviciding program under the authority of the Local Medical Officer of Health to control larval mosquitoes in order to prevent their development into vectors of West Nile Virus. The pellet formulation of the larvicide methoprene [provide Product Name and registration number under the Pest Control Products Act **(Canada)] will be placed into catch basins of storm drains in the following area [provide street address(es)]. All larvicide will be applied by Ministry of the Environment licensed applicators or trained technicians. For details on the exact locations and dates of treatment please call [1-800------ if not a toll-free number indicate collect calls will be accepted] or at the following web site: www.----------.**

Option 3

The conspicuous posting of a public area sign (rectangular and at least 51 cm high and 38 cm wide) every 100 metres along the perimeter of the surface water body OR at all entrances to the private property immediately before the application of the larvicide and remaining for at least 48 hours. The public area sign must include the following on the front of the sign:

- **red lettering with the words "WARNING" and "PESTICIDE USE"**
- **a red circle and red bar over a single black silhouette of an adult person**
- **black lettering with the words "FOR INFORMATION CONTACT" and "CALL COLLECT" and a telephone number provided in 1.5 cm high numerals (indicating collect calls will be accepted) that provides the public with information regarding the larviciding program and includes updates on the street location and dates of larviciding**
- **black lettering with the words "DATE POSTED" and "DATE SPRAYED" or "DATE APPLIED" (these dates will be the same since the sign must be posted immediately before larviciding - lettering and numerals must be 1.5 cm high)**

The public area sign must include the following on the back of the sign:

- **black lettering with the words "PESTICIDE" and 1.5 cm high lettering to indicate the name of the pesticide used (e.g., Methoprene or** Bacillus thuringeinsis israelensis **or the product name)**
- **black lettering with the words "REGISTRATION NUMBER" and 1.5 cm high numerals to indicate the** Pest Control Products Act **Number of the product**
- **black lettering with the words "TO CONTROL" and 1.5 cm high lettering to indicate the pest (e.g., Mosquito Larvae)**
- **A web site may be provided in the bottom 5 cm of the sign**

Example: Public Area Sign - NOT TO SIZE

WARNING

PESTICIDE USE

FOR INFORMATION CONTACT.....
CALLCOLLECT.....
DATE POSTED.....
DATE SPRAYED or.....
DATE APPLIED.....

Public Area Sign

Sign to be 51cm x 38cm (minimum) rain resistant, sturdy to be reused

➜Capital Red letters 5cm (minimum)

➜Black single silhouette of an adult person on white background. Red circle (outer edge a minimum of 21.5cm in diameter and width one tenth of the diameter) and oblique red bar

➜Capital Red letters 5cm (minimum)

➜Capital Black letters 1.5cm (minimum) and telephone number of representative or person performing the land extermination; numbers to be 1.5cm in height (minimum)

➜Capital Black letters 1.5cm (minimum) and long distance telephone number, if applicable; numbers to be 1.5cm in height (minimum)

➜Capital Black letters 1.5cm (minimum) and, day/month/year of posting, and/or preposting (if applicable) and day/ month/year of pesticide application; numbers to be 1.5cm in height (minimum)

➜Words or markings that identify the employer of the person performing the land extermination or that identify the owner/ occupier or person in charge and that do not detract from the sign; not to occupy more than bottom 5cm of the sign

PESTICIDE..... **REGISTRATION NUMBER.....** **TO CONTROL.....**	**➜Capital Black letters 1.5cm (minimum) and pesticide name; letters to be 1.5cm in height (minimum)** **➜Capital Black letters 1.5cm (minimum) and** Pest Control Products Act **No. (PCP No.) or** Fertilizers Act **No. (FA No.); numbers to be 1.5cm in height (minimum)** **➜Capital Black letters 1.5cm (minimum) and name of pest; letters to be 1.5cm in height (minimum)** **➜Words or markings that identify the employer of the person performing the land extermination or that identify the owner/ occupier or person in charge and do not detract from the sign, or additional words or markings that have been approved in writing by the Director under the** Act; **not to occupy more than bottom 5cm of the sign**

Appendix 3

Mosquito Larvicides Currently Federally Registered and Classified for Commercial Use In Ontario under permit for WNV

PCP No.	PRODUCT NAME ACTIVE INGREDIENT	AERIAL* (Yes/ No)	REGISTRANT/AGENT ADDRESS	ONT. SCH.
18158	Vectobac 200G Biological Larvicide Bacillus thuringiensis Serotype H-14 (0.2 ITU/L)	Y	Valent Biosciences Canada Ltd. 2100-40 King St. W. Scotia Plaza Toronto, ON, M5H 3C2	2
19239	Teknar Granules Larvicide for Mosquitoes Bacillus thuringiensis Serotype H-14 (260 AAU/mg)	Y	Valent Biosciences Canada Ltd. 2100-40 King St. W. Scotia Plaza Toronto, ON, M5H 3C2	2
19241	Teknar HP-D Larvicide for Mosquitoes/ Black-fly control Bth 3000 AU/mg	Y	Valent Biosciences Canada Ltd. 2100-40 King St. W. Scotia Plaza Toronto, ON, M5H 3C2	2
19466	Vectobac-200g Biological Larvicide Bth 200 ITU/mg	N	Valent Biosciences Canada Ltd. 2100-40 King St. W. Scotia Plaza Toronto, ON M5H 3C2	3
21062	Vectobac 1200L Biological Insecticide Bt Serotype H-14 (1.2 BIU/Kg)	Y	Valent Biosciences Canada Ltd. 2100-40 King St. W. Scotia Plaza Toronto, ON M5H 3C2	2
21809	Altosid Pellets Methoprene 4.25%	Y	Wellmark Int. P.O Box 20040, Woodlawn Postal Outlet Guelph, ON N1H 8H6	2
22676	Altosid Granules Methoprene 1.5%	Y	Wellmark Int. P.O Box 20040, Woodlawn Postal Outlet Guelph, ON N1H 8H6	2
26860	Aquabac xt Bt Serotype H-14 (1200 ITU/mg)	Y	AFA Environmental Inc. 1100 Rene Levesque Blvd. West, 25th Floor Montreal, QC H3B 5C9	2
26862	Aquabac 200G Bt Serotype H-14 (200 ITU/mg)	N	AFA Environmental Inc. 1100 Rene Levesque Blvd. West, 25th Floor Montreal, QC H3B 5C9	3
26863	Aquabac 200G Bt Serotype H-14 (200 ITU/mg)	Y	AFA Environmental Inc. 1100 Rene Levesque Blvd. West, 25th Floor Montreal, QC H3B 5C9	2
27694	Altosid XR Briquets Methoprene 2.1%	N	Wellmark Int. P.O Box 20040, Woodlawn Postal Outlet Guelph, ON N1H 8H6	2

Consult with the PMRA at 1-800-267-6315 to ensure current registration status.
*** A pesticide may only be applied by aircraft if the label directions specify this method of application.**

Aquabac 200G Biological Larvicide 10/14 is also registered (PCP No. 27374) and classified as DOMESTIC and classified in Ontario (Schedule 3). Consult label directions for specific user and application site restrictions.

Appendix 4 **MOE Permit Number**_____

GUIDANCE FOR BACILLUS THURINGIENSIS var. ISRAELENSIS (Bti) **EFFICACY MONITORING**

COLLECTION DATA	**Date:**	**Location No.:**	**Collector's Name:**
Location Description (if no location no.):			

BREEDING SITE DESCRIPTION

Site Type (Check one): Roadside Ditch __ Right-of-Way Ditch __ Woodland Pool __ Field Pool __ Dugout __ Culvert __ Slough __ Pond __ Rock Pool __ Tree Hole __ Marsh __ Swamp __ Fen __ Bog __ Storm Management Pond __
Other Type of Surface water Site _____

Organic level* of water: low __ moderate __ high ___	**Water Temperature: ____**
Pool Length (m): __ Width (m): __ Depth (m):___	**Emergent Vegetation: Nil __ Low __ Mod. __ High __**

*** Organic content of the water can be determined by taking a clear glass container and dipping it below the water surface. Hold the glass container up to the light. If you can see through the water the organic content is low, if the water is translucent the organic content is moderate and if you cannot see through the water the organic content is high. If algae or scum is found on the water surface the water should be considered as high organic content.**

PRE-LARVICIDING SEQUENTIAL SAMPLING **Pool rating*: Nil __ Low __ Moderate __ High___ (see below)**

Dip No.	No. of Larvae	Cumulative No.	Dip No.	No. of Larvae	Cumulative No.
1			6		
2			7		
3			8		
4			9		
5			10		

*** Pool Rating**

- **If no larvae are collected, the site is rated as "nil".**
- **If only 1 or 2 larvae are collected in 10 dips, this site is rated as "low".**
- **If 7-30 larvae are collected in 10 dips, this site is rated as "moderate".**
- **If >31 larvae are collected in 10 dips, this site is rated as "high".**
- **If the number of larvae collected in at least 5 dips is 51 or more, the site is rated as "high".**

Note: if the surface area of the site is greater than 50 m by 50 m (2500 m^2), then the number of dips taken must be doubled.

SPECIES IDENTIFICATION

Culex pipiens **CP,** Culex restuans **CR,** Culex salinarius **CS,** Aedes vexans **AV,** Coquillettidia pertubans **CP,** Anopheles punctipennis **AP,**Ochlerotatus triseriatus **OT,** Ochlerotatus cantator **OC,** Ochlerotatus trivattatus **OTR.**

Species Code	Larva Instar (1-4)	No. Identified	Species Code	Larva Instar (1-4)	No. Identified

POST-LARVICIDING SEQUENTIAL SAMPLING			Pool rating*: Nil __ Low __ Moderate __High ____		
Dip No.	**No. of Larvae**	**Cumulative No.**	**Dip No.**	**No. of Larvae**	**Cumulative No.**
1			**6**		
2			**7**		
3			**8**		
4			**9**		
5			**10**		

Appendix 5 **MOE Permit Number_____**

GUIDANCE FOR METHOPRENE EFFICACY MONITORING

COLLECTION DATA	Date:	Location No.:	Collector's Name:
Location Description (if no location no.):			

BREEDING SITE DESCRIPTION

Site Type (Check one): Catch Basin/Storm Drain __ Sewage Lagoon __ Sludge Lagoon __	
Organic level* of water: low __ moderate __ high ___	Water Temperature: ____
Lagoon Length (m): ____ Width (m):____ Depth (m):____	Emergent Vegetation: Nil __ Low __ Mod.

*** Organic content of the water can be determined by taking a clear glass container and dipping it below the water surface. Hold the glass container up to the light. If you can see through the water the organic content is low, if the water is translucent the organic content is moderate and if you cannot see through the water the organic content is high. If algae or scum is found on the water surface the water should be considered as high organic content.**

PRE-LARVICIDING SEQUENTIAL SAMPLING — **Pool rating*: Nil ___ Low ___ Moderate __ High__ (see below)**

Dip No.	No. of Larvae	Cumulative No.	Dip No.	No. of Larvae	Cumulative No.
1			6		
2			7		
3			8		
4			9		
5			10		

*** Pool Rating**

- **If no larvae are collected, the site is rated as "nil".**
- **If only 1 or 2 larvae are collected in 10 dips, this site is rated as "low".**
- **If 7-30 larvae are collected in 10 dips, this site is rated as "moderate".**
- **If >31 larvae are collected in 10 dips, this site is rated as "high".**
- **If the number of larvae collected in at least 5 dips is 51 or more, the site is rated as "high".**

Note: if the surface area of the site is greater than 50 m by 50 m (2500 m^2), then the number of dips taken must be doubled.

SPECIES IDENTIFICATION

Culex pipiens **CP,** Culex restuans **CR,** Culex salinarius **CS,** Aedes vexans **AV,** Coquillettidia pertubans **CP,** Anopheles punctipennis **AP,**Ochlerotatus triseriatus **OT**, Ochlerotatus cantator **OC,** Ochlerotatus trivattatus **OTR.**

Species Code	Larva Instar (1-4)	No. Identified	Species Code	Larva Instar (1-4)	No. Identified

POST-LARVICIDING MONITORING FOR METHOPRENE EFFICACY

1. **Determine the catch basins that will be used in the monitoring study. Take samples of pupae from these same catch basins every week. Note the date when the larvicide was applied, the organic content, any oil sheen on water surface and temperature of the water. Do not take samples after a major rain event since pupae will likely to have been flushed out of the catch basin.**
2. **Collect 3 separate samples of pupae* only once a week from each of the randomly selected treated catch basins and from nearby untreated catch basins (if available). Record number of pupae.**
3. **Place the pupae in a covered foam coffee cup or soup container (half-filled with water from the catch basin) and cover with netting or screening. Transport in a cooler with ice packs. Place the container in a sheltered area where the pupae will not be disturbed. Keep at a constant temperature, without direct light (i.e., they can be kept in a room in which the light is on during the day and turned off at night).**
4. **Check for emergence every day for up to four days and identify the emerged species.**
5. **Count the number of dead pupae (DP), dead adults (DA) and alive adults (AA).**
6. **Use the following formula to determine the % control = (DP+DA) ÷(DP+DA+AA) x 100**
7. **Record results in an Excel spreadsheet format to facilitate calculations (see example below)**

Most catch basins should have less than 10% emergence up to 21 days using methoprene pellets. Some catch basins may show less control (perhaps due to flushing, larger than normal size catch basin or storm drain, or some other reason) and should be retreated.

*** Pupae may be difficult to capture, if so, capture late 4th instar larvae and allow to pupate. These should remain separate from any captured pupae. Do not capture earlier instars as these will not provide a measure of efficacy.**

Recording Results:

Treated Site	No. of Pupae	DP	DA	AA	% Control	Control Site	No. of Pupae	DP	DA	AA	% Control
Sample 1						Sample 1					
Sample 2						Sample 2					
Sample 3						Sample 3					
Sample 4						Sample 4					
Sample 5						Sample 5					
Sample 6						Sample 6					
Sample 7						Sample 7					
Sample 8						Sample 8					
Sample 9						Sample 9					
Sample 10						Sample 10					

Appendix 6
Sensitive Areas Definitions

SENSITIVE AREA are defined by the Ministry of Natural Resources (MNR) as critical fish habitat, e.g., spawning areas, wetlands, headwaters, migration areas, nursery areas, intermittent streams that provide spawning habitat for fish; fish sanctuaries; fish hatcheries; stocked lakes and rivers; endangered species, protected species or species at risk habitat; patented land.

SENSITIVE AREAS REQUIRING PROTECTION - DEFINITIONS

CRITICAL FISH HABITAT: Is habitat judged to be of critical importance to the maintenance of a healthy fish population (includes: feeding areas, migration areas; nursery areas; spawning areas).

WETLANDS: Are lands that are seasonally or permanently covered by shallow water as well as lands where the water table is close to, or at the surface; in either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants. The general term wetlands, includes specific land types that are known as marshes, bogs, swamps and fens.

- **Swamps are wooded wetlands with 25% cover or more of trees or tall shrubs. In swamps, standing to gently flowing waters occur seasonally or persist for long periods on the surface. Swamps include both forest and thicket swamps.**
- **Marshes are areas periodically inundated with standing or slowly moving water, and/or permanently inundated characterized by robust emergents, and to a lesser extent, anchored floating plants and submergents.**
- **Bogs are peat-covered areas or peat-filled depressions with a high water table and a surface carpet of mosses, chiefly** Sphagnum **spp.**
- **Fens are peatlands characterized by surface layers of poorly to moderately decomposed peat, often with well decomposed peat near the base. They are covered by a dominant component of sedges, although grasses and reeds may be associated in local pools.**

HEADWATER AREA: Is the area starting at the lake highest up in the watershed which requires protection under the guidelines (either greater than 10 ha or with a known fisheries value) and continues up each inflow to this lake until the top of the stream occurs, or there is a wetland, lake or beaver pond with significant retention capacity.

FISH SANCTUARY: Is a water body (or a portion of a water body) in which fishing for all species is prohibited for a specified period of time and is identified in the annual Ontario Sport Fishing Regulations, published by the Ministry of Natural Resources at http://www.mnr.gov.on.ca/MNR/fishing/gen.html.

FISH HATCHERY: Is a designated area of fish rearing.

ENDANGERED SPECIES HABITAT: Is the sum total of environmental conditions of a specific place occupied or potentially occupied by an endangered species (as designated in Regulations of the Ontario Endangered Species Act**) or a population of such species.**

Additional Areas Requiring Protection

HUMAN RECREATION: Areas of human water recreation used for swimming, wading etc.

Appendix 7

Assessing Catch Basins to Determine Application Rate of Methoprene Pellets

Most modern catch basins are cylindrical, have 900 mm diameter (0.9 m diameter or 0.45 m radius), are 2.3-2.4 m deep in total (including ring spacers and cover), have a water depth below the outlet pipe of 600 mm (when there is no flow), and a water surface area of 0.636 m². However, older catch basins may be of different sizes, shapes, and have different surface areas. Thus, it is important that mosquito control workers consult local public works officials on the dimensions of the catch basins in any particular area of the jurisdiction. Catch basins in newer suburban areas may differ in size from those in older downtown areas and along highways within a municipality or Health Unit.

Public Work officials may be able to provide computer-based maps and a numbering system for the catch basins within their jurisdiction. Some databases may also include information on the size of individual catch basins.

Drainage from some catch basins may be partially blocked, increasing the total water volume associated with that catch basin and others 'upstream' from it. Local water engineers may be able to advise on what percentage of the catch basins fall into this category and where they are most likely to be located.

Calculations showing how much methoprene pellets to apply to a standard modern catch basin have been provided (see below). It may be necessary to inspect a representative sample of catch basins (e.g., 1%) and base the application rate on the average surface area of the catch basins in an area.

Sample Calculations

Assumption: the catch basin has a 0.45 m radius.

Formula Used: Area (circle) = Πr^2 (pi x radius squared) where Π = 3.14159

Area of Standard Catch Basin: 3.14159 x 0.45 m x 0.45 m = 0.636 m²

Application Rates based on methoprene pellets: Label rate states - 5.6 -11.2 kg/ha or 0.56 -1.12 g/m^2 of water surface, then

Low application rate = 0.636 m² x 0.56 g/m^2 = 0.356 g

High application rate = 0.636 m² x 1.12 g/m^2 = 0.712 g

The water in a catch basin can be considered to be polluted and/or highly organic therefore the high application rate is recommended on the label.

Amount to Use per Catch Basin:

How much methoprene pellets is 0.712 g?

From the Material Safety Data Sheet (MSDS), we find Specific Gravity = 1.04 g/cc

Thus, 1.04 g/1 cc = 0.712 g/'x' cc; therefore, 'x' = 0.69 cc

Because 1 teaspoon = 5 cc then 0.69 cc = ~ 0.14 teaspoons use slightly under a quarter teaspoon/ standard catch basin

Measuring Spoons:

Long-handled measuring spoons are available as part of a set from most food and department stores. Due to the irregular shape of the pellets, a level 0.25 teaspoon of methoprene pellets would be a practical treatment per one standard catch basin.

Appendix 8

Submitting Geo-spacial Information for Private Land Mosquito Control Programs

The use of Geographic Information System (GIS) databases will provide a more efficient way of analysing the surveillance, monitoring and larviciding data collected to manage West Nile virus. The Ministry of the Environment is encouraging that all mapping data be submitted in electronic format including digital mapping coordinates derived from Global Positioning Systems (GPS). Digital map coordinates for all catch basins, ditches, temporary and permanent pools and storm water retention ponds areas could be submitted with either the permit application and/or final report. MOE will use the information to generate provincial maps for Ministry purposes in evaluating permit applications.

To ensure that there is consistency across the province, all geo-spacial data including both map coordinates and tabular information need to be submitted in electronic format conforming to the data standards summarized below.

The standards which follow apply to all data submitted including format requirements for digital mapping coordinates and address standards:

- **Electronic map files must be ESRI-compatible (i.e., Arc/Info coverages or ArcGIS shape files) referenced to North American Datum 83 (NAD83) projected using the Universal Transverse Mercator (UTM) projection system. UTM zone and accuracy estimates must be provided (see example below)**
- **All map coordinates should be submitted in a spreadsheet or database (Excel or MS Access)**
- **When data is submitted electronically in a spread sheet or database format, columns should use clearly identified titles and provide a detailed description of codes used**
- **Standard street addresses must include street number, proper spelling of the street name, standard abbreviations (see below), direction (N, S, E, W) and municipality addresses should not include any punctuation**

Map Data Example:

ID	Zone	Easting	Northing	Accuracy
1	17	611630.56	4861180.03	±10m
2	17	622507.43	4865770.27	±10m

Address Example:

ID	Address	Municipality
1	1180 Lakeshore RD W	Toronto
2	252 Bloor ST E	Toronto
3	2075 Bayview AVE	Toronto

Some of the most common abbreviations include, but are not limited to the following:

Avenue	**AVE**	**Gardens**	**GDNS**	**Square**	**SQ**
Bay	**BAY**	**Gate**	**GATE**	**Sideroad**	**SR**
Beach	**BEACH**	**Heights**	**HTS**	**Street**	**ST**
Boulevard	**BLVD**	**Highway**	**HWY**	**Terrace**	**TERR**
Centre	**CTR**	**Lane**	**LANE**	**Trail**	**TRAIL**
Circle	**CIR**	**Line**	**LINE**	**View**	**VIEW**
Concession	**CONC**	**Meadow**	**MEADOW**	**Way**	**WAY**
Corners	**CRNRS**	**Park**	**PK**		
Court	**CRT**	**Parkway**	**PKY**		
Cresent	**CRES**	**Path**	**PATH**		
Cul-de-sac	**CDS**	**Place**	**PL**		
Drive	**DR**	**Point**	**PT**		
Expressway	**EXPY**	**Road**	**RD**		

Appendix 9

Wetland Protocol

Ontario Ministry of Natural Resources Process for Providing Input to MOE Concerning West Nile Virus Larvicide Treatments in Wetland Habitats

INTRODUCTION

Public health units may order the use of larvicides in wetlands, to control mosquito populations and the spread of West Nile Virus (WNv). Decisions to implement WNv control measures are based on local risk assessments, which include consideration of the results of mosquito larvae surveillance and proximity of areas of standing water to inhabited areas.

The Ontario Ministry of the Environment (MOE) is responsible for regulating and licensing the use of pesticides, including the larvicides used to control mosquito populations. The bacterial larvicide Bacillus thuringiensis israelensis **(**Bti**) is the only mosquito treatment permitted in wetlands. It targets the larvae of mosquitoes and other dipterans.**

An inter-agency review committee has been established, in response to the potential negative impacts of such treatments on rare and sensitive species that may be present in these habitats. The committee consists of representatives from the Ontario Ministry of Natural Resources (MNR), MOE, and two federal agencies: Environment Canada (E.C.), and Fisheries and Oceans Canada (DFO). Appendix A lists all committee members.

Legislative and Policy Framework: (Note: all Acts are available on line at www.e-laws.gov.on.ca)

- Endangered Species Act: **WNv larvicide treatments must take account potential impacts on species regulated under this provincial legislation**.

- Species at Risk Act**: The prohibitions and enforcement components of this federal legislation have been delayed for approximately one year, until June 2004. However, sections that relate to the assessment of species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are now in force, as are other sections that address requirements for the preparation of recovery strategies, action plans or management plans for species listed in Schedule 1 (as applicable) and requirements to conduct environmental assessments.**

- **Accord for the Protection of Species at Risk in Canada: As a signatory to this (1996) agreement, Ontario has made a commitment to participate in a national program that seeks to achieve the protection and recovery of species at risk, and the monitoring of all wild species. Under the Accord, signatories agree, among other things, to "provide protection for the habitat of threatened or endangered species" and to "emphasize preventative measures to keep species from becoming at risk."**

The committee provides a forum for discussion of potential impacts of WNv larvicide treatments on species at risk (SAR). The objective of the committee is to provide the MOE recommendations - which areas are to be treated, and how - that will minimize impacts on SAR.

- Fisheries Act:

Section 36: **The use of larvicides or other pesticides in areas considered to be waters frequented by fish, or fish habitat or in places where they are likely to enter waters frequented by fish or fish habitat can be considered as deposit of deleterious substances under Subsection 36(3) of the** Fisheries Act**. Section 36 would apply to wetlands designated to be fish habitat.**

The Compliance and Enforcement Policy for the Habitat Protection and Pollution Prevention Provisions of the Fisheries Act **states that compliance with the federal** Fisheries Act **is mandatory. Subsection 36(3) of the** Fisheries Act **specifies that unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water. Proponents should note that only a federal regulation under the** Fisheries Act **or another Act of Parliament can authorize a discharge of a deleterious substance; no federal permit, provincial, territorial or municipal regulatory permit or approval allows for exemption from the** Fisheries Act**.**

For pesticide applications, alternatives to use in areas of waters frequented by fish or fish habitat should be fully investigated. For situations where there is the likelihood of entry of these pesticides into areas of fish habitat, each situation should be assessed on a case by case basis to determine if there is the potential for deleterious impacts on the aquatic community. Environment Canada will assess each situation brought to its attention to determine whether or not there are reasonable grounds to believe that there is the potential for violation of section 36(3) of the Fisheries Act**."**

Section 35 **: Subsection 35(1) prohibits works or undertakings that result in the harmful alteration, disruption or destruction of fish habitat (HADD), unless authorized by the federal Minister under section 35 (2).**

NOTE: section 35 is pertinent to any proposal that would physically impact fish habitat (i.e., filling in wetlands or creeks, etc.), as opposed to larvicide applications, which are subject to section 36.

Implementation of section 35 is a cooperative effort involving a number of federal and provincial agencies, including the Department of Fisheries and Oceans, Environment Canada, conservation authorities, MNR and MOE. DFO is responsible for protecting habitats that contribute directly or indirectly to Canada's fisheries resources. If a HADD of Canadian fisheries waters (a creek, lake or littoral wetlands) is proposed, DFO should be consulted either directly or through the local conservation authority. DFO-conservation authority agreements assist in providing a streamlined approach to regulatory approvals.

Note that the determination of whether or not a given area would be considered as Canadian fisheries waters is not always straightforward. Back yard ponds and roadside ditches typically are not considered to be such, and therefore are of less concern.

If additional information is required, Medical Officers of Health and other provincial and local officials are encouraged to contact regional officials of DFO and EC. The Pest Management Regulatory Agency (PMRA) is the lead federal agency regulating the use of pesticides, and should also be involved in discussions.

- **EC's regional offices are listed on the following website: http://www.ec.gc.ca/commentreg_e.html**

- **DFO's contacts are listed by region on the following website: http://www.dfo-mpo.gc.ca**

REVIEW PROCESS

- **MOE advises appropriate MNR District Office, upon receipt of an application to apply** Bti **in wetlands. MOE is responsible for providing MNR with information on the wetland to be treated (name and location), and proposed** Bti **treatment schedule.**

Note: In order to facilitate information exchange and the decision-making process for WNv larviciding, OMNR Districts are encouraged to provide public health units and MOE Regional Pesticide Officers with our maps. Provincial digital data are available via a shared folder, at: \\mnrpbapc0888\WNv_Maps. These maps show health unit boundaries, MNR district boundaries, Crown land, Provincial Parks, federal lands and evaluated wetlands. These are intended as a starting point for designated district or parks staff who will be dealing with health units. Districts may want to add other or better coverage as required e.g., Species at Risk, unevaluated wetlands, local coverage of wetlands.

- **MNR District staff accesses the Natural Heritage Information Centre's (NHIC) Natural Areas Database to determine if any endangered, threatened or otherwise "sensitive" species are known to be present in the wetland. Two species lists have been developed: one by MNR's Species at Risk Section; and the other by NHIC. These lists will be updated on a regular basis as the evaluation and listing/regulation of species at risk at both provincial and national/federal levels is an ongoing process. MNR District staff should contact the Species at Risk Section of Ontario Parks and NHIC to ensure that the District has the most current versions of the lists.**

- **MNR District staff forwards this information, in confidence, to the inter-agency committee and arranges a meeting or conference call to review the information. If a species of concern is found within the wetland, Ontario Parks' Species at Risk Section, and the Natural Heritage Information Centre can provide advice on potential impacts/referrals to other experts. A site visit may help facilitate the review process.**

- **MOE, with input from MNR, provides a written summary to all participants of the decisions made.**